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Substitute for form 1448A/PTO			<b>Complete if Known</b>		
<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b>  (use as many sheets as necessary)			Application Number		
			Filing Date	10 October 2003	
			First Named Inventor	Lester F. Ludwig	
			Group Art Unit		
			Examiner Name		
Sheet	1	of	13	Attorney Docket Number	2738-16

U.S. PATENT DOCUMENTS						
Examiner Initials *	Cite No. <sup>1</sup>	Document Number		Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number - Kind Code <sup>2</sup> (if known)				
12/4	A1	US-1,947,020	02-13-1934	Ranger		
	A2	US-3,493,669	02-03-1970	Elbrecht et al.		
	A3	US-3,591,699	07-06-1971	Cutler		
	A4	US-3,612,741	10-12-1971	Marshall		
	A5	US-3,651,242	03-21-1972	Evans		
	A6	US-3,730,046	05-01-1973	Spence		
	A7	US-3,742,133	06-26-1973	Cohen		
	A8	US-3,805,091	04-16-1974	Colin		
	A9	US-3,813,473	05-28-1974	Terymenko		
	A10	US-3,878,748	04-22-1975	Spence		
	A11	US-3,956,959	05-18-1976	Ebihara et al.		
	A12	US-3,962,945	06-15-1976	Creager et al.		
	A13	US-4,075,921	02-28-1978	Heet		
	A14	US-4,080,867	03-28-1978	Ratanangsu		
	A15	US-4,117,413	06-26-1978	Moog		
	A16	US-4,122,742	10/31/1978	Deutsch		
	A17	US-4,151,368	04-24-1979	Fricke et al.		
	A18	US-4,182,213	01-08-1980	Iodice		
	A19	US-4,274,321	06-23-1981	Swartz		
	A20	US-4,318,327	03-09-1982	Toups		

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No. <sup>1</sup>	Foreign Patent Document	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T <sup>2</sup>
		Country Code <sup>3</sup> - Number <sup>4</sup> - Kind Code <sup>5</sup> (if known)				
	B1	EP-0 574 213-A1	12-15-1993	Synaptics, Inc.		

Examiner Signature	<i>Markus Blatch</i>	Date Considered	8/6/07
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\* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> See Kinds Codes of USPTO Patent Documents at [www.uspto.gov](http://www.uspto.gov) or MPEP 901.04.

<sup>3</sup> Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>4</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>5</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. <sup>6</sup> Applicant is to place a check mark here if English language Translation is attached.

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Substitute for form 1449A/PTO

*(use as many sheets as necessary)*

Sheet	2	of	13
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**Complete If Known**

Application Number

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10 October 2003

First Named Inventor

**Lester F. Ludwig**

### Group Art Unit

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[Signature]	A21	US-4,385,533	12-28-1982	Clark, Jr. et al.	
	A22	US-4,781,099	11-01-1988	Kolke	
	A23	US-4,794,838	01-03-1989	Corrigau, III	
	A24	US-4,797,608	01-10-1989	White	
	A25	US-4,852,444	08-01-1989	Hoover et al.	
	A26	US-4,991,488	02-12-1991	Fala et al.	
	A27	US-5,033,352	08-23-1991	Kellogg et al.	
	A28	US-5,045,687	09-03-1991	Gurner	
	A29	US-5,070,399	12-03-1991	Martel	
	A30	US-5,148,833	09-15-1992	Lui	
[Signature]	A31	US-5,159,140	10-27-1992	Kimpara et al.	
	A32	US-5,218,160	08-08-1993	Grob-Da Velga	
	A33	US-5,233,123	08-03-1993	Rose et al.	
	A34	US-5,262,585	11-18-1993	Greene et al.	
	A35	US-5,281,754	01-25-1994	Farrett et al.	
	A36	US-5,292,999	03-08-1994	Tumura	
	A37	US-5,357,048	10-18-1994	Sgrol	
	A38	US-5,378,850	01-03-1995	Tumura	
	A39	US-5,440,072	08-08-1995	Willis	
	A40	US-5,442,168	08-15-1995	Gurner et al.	

[illegible]

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8/6/07

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**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**

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Sheet 3 of 13

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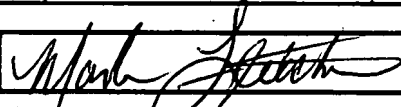
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Attorney Docket Number	2738-16

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		Number - Kind Code <sup>2</sup> (if known)			
	A41	US-5,459,282	10-17-1995	Willis	
	A42	US-5,471,008	11-28-1995	Fujita et al.	
	A43	US-5,475,214	12-12-1995	DeFranco et al.	
	A44	US-5,585,841	10-15-1996	Gruenbaum	
	A45	US-5,585,588	12-17-1996	Tumura	
	A46	US-5,659,145	08-19-1997	Weil	
	A47	US-5,659,466	08-19-1997	Norris et al.	
	A48	US-5,665,927	09-09-1997	Taki et al.	
	A49	US-5,868,338	09-18-1997	Hewitt et al.	
	A50	US-5,675,100	10-07-1997	Hewlett	
	A51	US-5,741,993	04-21-1998	Kushimiya	
	A52	US-5,763,806	08-09-1998	Willis	
	A53	US-5,788,540	08-28-1998	Westlund	
	A54	US-5,827,989	10-27-1998	Fay et al.	
	A55	US-5,850,051	12-15-1998	Machover et al.	
	A56	US-5,852,251	12-22-1998	Su et al.	
	A57	US-5,932,827	08-03-1999	Osborne et al.	
	A58	US-5,989,283	10-19-1999	Looney et al.	
	A59	US-6,047,073	04-04-2000	Norris et al.	
	A60	US-6,051,769	04-18-2000	Brown, Jr.	

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Sheet	4	of	13	Application Number	
				Filing Date	10 October 2003
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		Number - Kind Code <sup>2</sup> (if known)			
	A81	US-6,100,481	08-08-2000	Hewitt	
	A82	US-6,140,585	10-31-2000	Yamauchi et al.	
	A83	US-6,204,441 B1	03-20-2001	Asahi et al.	
	A84	US-6,288,317 B1	09-11-2001	Willis	
	A85	US-6,310,279 B1	10-30-2001	Suzuki et al.	
	A86	US-6,320,112 B1	11-20-2001	Lotze	
	A87	US-6,360,019 B1	03-19-2002	Chaddha	
	A88	US-6,363,159 B1	03-26-2002	Rhoads	
	A89	US-6,392,705 B1	05-21-2002	Chaddha	
	A70	US-6,404,898 B1	06-11-2002	Rhoads	

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Examiner Signature		Date Considered	8/6/07
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		Filing Date	10 October 2003
		First Named Inventor	Lester F. Ludwig
		Group Art Unit	
		Examiner Name	
Sheet 5 of 13	Attorney Docket Number	2738-16	

OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS			
Examiner Initials *	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>2</sup>
No Date		<del>"Biax True Stereo Pickups," product description, Musician's Friend catalog.</del>	
No Date		<del>"Korg's New Z-1 Helps Fiddler Keep His Funk", Music and Sound Retailer, Mar. 1998.</del>	
No Date		<del>"Synaptics Targets Vision, Sound processing."</del>	
No Date	C4	"Yamaha VL1", advertisement, Electronic Musician, Apr. 1994.	
No Date		<del>APPETLMAN, D. RALPH, The Science of Vocal Pedagogy, Theory and Applications, 1967, Indiana University Press, Bloomington, Indiana, USA.</del>	
No Date		<del>Blaxe Ragamaster, Box 15426, Stamford, CT, 06901-0426, USA.</del>	
Yes	C7	BICANIC, DANE, ed. Photoacoustic and Photothermal Phenomena III. 1992, vol. 69, Springer-Verlag, Berlin Heidelberg, Germany.	
Yes	C8	BORMANS, JAN "MPEG-4 systems need specialized CPUs", Electronic Engineering Times, Jan. 25, 1999.	
No Date		<del>Boss DF-2, Roland Corporation, 7200 Dominion Circle, Los Angeles, CA 90040-3696, USA.</del>	
No Date	C10	Boss OC-2 Service Manual, Roland Corporation, 7200 Dominion Circle, Los Angeles 90040-3696, CA, USA.	
No Date	C11	<del>Boss SE-70 Super Effects Processor Algorithm Guide, Roland Corporation, 7200 Dominion Circle, Los Angeles, CA 90040-3696, USA.</del>	

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	C12	<del>Boss SE-70 Super Effects Processor Owners Manual, Roland Corporation, 7200 Dominion Circle, Los Angeles, CA 90040-3696, USA.</del>	
	C13	<del>CP-40 Pitch-to-Midi Converter, Roland, 7200 Dominion Circle, Los Angeles, CA 90040-3696, USA.</del>	
	C14	<del>DMP9-16 Digital Mixing Processor, Yamaha Corporation, PO Box 1, Hamatsu, Japan.</del>	
	C15	<del>DP/4, Ensoniq, 155 Great Valley Parkway, Malvern, PA 19356, USA.</del>	
	C16	<del>E-Bow, Heet Sound Products, PO Box 3312, 611 Ducommun St., Los Angeles, CA 90051, USA.</del>	
	C17	EPSTEIN, "The Search for New Chemical Oscillators," in Chemical Instabilities, Nicolis and Baras (eds.), 1984, D.Reidel Publishing, Dordrecht/Boston/Lancaster.	
	C18	EPSTEIN, IRVING R, "New Chemical Oscillators", Non-Equilibrium in Chemical Systems, 1984, Springer-Verlag, Berlin/Heidelberg, Germany.	
	C19	Ernie Ball, Volume <del>Pedal</del> , Musician's Friend Catalog.	
	C20	Etc., PETER, Letter to Editor, Experimental Musical Instruments, Jun., 1996.	
	C21	<del>EWI3020, AKAI Corporation, Box 2344 Fort Worth, TX 76113, USA.</del>	
	C22	FIELD, RICHARD J., and NOYES, RICHARD M. "Oscillations in Chemical Systems IV Limit Cycle Behavior in a Model of a Real Chemical Reaction," J. Chem. Physics, Vol. 60, No. 5, Mar. 1974.	

Examiner Signature	<i>M. J. Smith</i>	Date Considered	8/6/07
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	C23	GI-10 Guitar-Midi Interface, Roland Corporation, 7200 Dominion Circle, Los Angeles, CA 90040-3696, USA.	
<i>ms</i>	C24	GRAY, PETER, and SCOTT, STEPHEN K, "Chemical Oscillations and Instabilities," 1990, Clarendon Press, Oxford, Great Britain.	
	C25	GSP 21 LEGEND, Digitech, 8760 South Sandy Parkway, Sandy, UT 84070, USA.	
<i>ms</i>	C26	GZOWSKI, JOHN "Sirens and Sympathetics", Experimental Musical Instruments, Jun. 1997, vol. 12, No. 4.	
<i>ms</i>	C27	HARA, YOSHIKO "Matsushita demos multilayer MPEG-4 compression", Electronic Engineering Times, Apr. 19, 1999.	
<i>ms</i>	C28	JOHNSON, COLIN "Computer program recognizes facial expressions", Electronic Engineering Times, Apr. 12, 1999.	
<i>ms</i>	C29	JOHNSON, COLIN "Image sensor tracks moving objects in hardware", Electronic Engineering Times, Apr. 5, 1999.	
<i>ms</i>	C30	Kaoss pad dynamic effect/controller, Korg Proview Users' magazine, Summer 1999.	
	C31	KING and WHITE, "Tactile Sensing Array Based on Forming and Detecting an Optical Image," UC Berkeley Preprint.	
<i>ms</i>	C32	KURAMOTO, YOSHIKI, "Rhythms and Turbulence in Populations of Chemical Oscillators", Physica 106A (1981), pp. 128-143, North-Holland.	
<i>ms</i>	C33	LEIBERMAN, DAVID "Software goes on a search-and-locate mission", Electronic Engineering Times, Jan. 25, 1999, pp. 44.	

Examiner Signature	<i>[Signature]</i>	Date Considered	8/6/07
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<i>[Signature]</i>	C34	LEIBERMAN, DAVID "Touch screens extend grasp into consumer realm" Electronic Engineering Times, Feb. 8, 1999.	
	C35	<del>Light Wave Pickups, Audio Optics, Santa Barbara, CA., USA.</del>	
<i>[Signature]</i>	C36	LIM, AGRAWAL, and NEKLUDOVA "A Fast Algorithm for Labeling Connected Components in Image Arrays", Technical Report Series, No. NA86-2, Thinking Machines Corp., 1986 (rev. 1987), Cambridge, Mass., USA.	
	C37	<del>Lord LTS-300T Tactile Array Sensor, Lord Corp., Ind. Aut. Div., 407 Gregson Dr., PO Box 8200, Cary, NC, 27511-8200, USA.</del>	
<i>[Signature]</i>	C38	LUDWIG, L., "A Generalized Linear Amplitude Processor," Electronotes, Dec. 1979, vol. 11, No. 108.	
<i>[Signature]</i>	C39	LUDWIG, L., "A Square-Wave Frequency-Division Sub-Octave Cross-Product Module," Electronotes, Feb. 1979, Vol. 11, No. 98.	
<i>[Signature]</i>	C40	LUDWIG, L., "GLAP Revisited," Electronotes, Jul. 1981, vol. 13, No. 127.	
<i>[Signature]</i>	C41	LUSHER, E. (unk) "Photoacoustic effect: principles and applications: proceedings of the First International Conference on the Photoacoustics," 1984, Vieweg.	
	C42	MIDI Player MP-88, Miditemp, Max-Halbe-Strasse 1 85716 Unterschleissheim, Germany 0049-89-3-10-61-38.	
<i>[Signature]</i>	C43	MOOG, ROBERT A. "The Human Finger-A Versatile Electronic Music Instrument Component", Audio Engineering Society Preprint, 1977, New York, NY, USA.	
	C44	<del>MS4-MS3 Solton, Ketron lab, dist. By Bell Doudvox Corp. 126 Rt. 303, 10994 W. Nyack, NY, USA.</del>	

Examiner Signature <i>[Signature]</i>	Date Considered <i>8/6/07</i>
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<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b>  (use as many sheets as necessary)		Application Number	
		Filing Date	10 October 2003
		First Named Inventor	Lester F. Ludwig
		Group Art Unit	
		Examiner Name	
Sheet 9 of 13	Attorney Docket Number	2738-16	

OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS			
Examiner Initials *	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>2</sup>
<i>[initials]</i>	C45	MURPHY, AAMODT, Spicer and Royce (eds) Photoacoustic and Photothermal Phenomena II, 1990, vol. 62, Springer-Verlag, Berlin Heidelberg, Germany.	
<i>[initials]</i>	C46	NAGY-UNGVARAI, Z. and HESS, BENNO "Control of Dynamic Pattern Formation in the Belous-ov-Zhabotinsky Reaction" Physica D (1991) North-Holland.	
<i>[initials]</i>	C47	NICOLIS, G and BARAS, F (eds.), Chemical Instabilities, 1984, D.Reidel Publishing, Dordrecht/Bos-ton/Lancaster.	
<i>[initials]</i>	C48	NICOLIS, G., "Nonlinear Phenomena In Chemistry", Introduction to Nonlinear Science, 1995, Cambridge University Press, Great Britain.	
	C49	<del>Omnichord OM-250m, Suzuki, Box 261030, San Diego, CA 92196, USA.</del>	
<i>[initials]</i>	C50	ORBAN, M., KURIN-CSORGEI, K., ZHABOTINSKY, A, and EPSTEIN, I, "New Indicators for Visualizing Pattern Formation in Uncatalyzed Bromate Oscillatory Systems", J. Am. Chem. Soc. 1998, Vol. 120, pp. 1146-1150.	
	C51	<del>PC-1600 Midi Controller, Peavey Corporation, 711 A St., Meriden, MS 39302-2898, USA.</del>	
<i>[initials]</i>	C52	PENNYWITT, KIRK "Robotic Tactile Sensing," Byte, Jan., 1986.	
	C53	<del>PLM 8128E, Peavey Corporation, 711 A St., Meriden, MS 39302-2898, USA.</del>	
	C54	<del>PMC10 Program. MIDI Foot Controller, Digitech, Salt Lake City, UT, USA.</del>	
<i>[initials]</i>	C55	Review of KORG X-230 Drum (later called "Wave Drum"), Electronic Musician, Apr. 1994.	

Examiner Signature	<i>[Signature]</i>	Date Considered	8/6/03
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	C56	RICH, ROBERT "Buchla Lightning MIDI Controller", Electronic Musician, Oct. 1991.	
	C57	RICH, ROBERT "Buchla Thunder", Electronic Musician, Aug. 1990.	
	C58	ROADS, C., "A Tutorial on Non-linear Distortion or Waveshaping Synthesis," Computer Music Journal, Vol. 3, No. 2, pp. 29-34, June 1979, People's Computer Company, Menlo Park, CA, USA.	
	C59	Robotic Tactile Sensing, Kirk Pennywitt, BYTE, Jan. 1986.	
	C60	Roland's COSM: A Whole New World of Sounds, Kikumoto/Meyer, Roland Users' Magazine, 7200 Dominion Circle, Los Angeles, CA, 90040-3696, USA.	
	C61	RONSE, CHRISTIAN and DEVIJVER, PIERRE A., Connected Components in Binary Images: the Detection Problem, 1984, Research Studies Press/ John Wiley & Sons Inc., New York, NY, USA.	
	C62	RSP-550 Algorithm Guide, Roland Corporation, 7200 Dominion Circle, Los Angeles, CA 90040-3696, USA.	
	C63	RSP-550 Owners Manual, Roland Corporation, 7200 Dominion Circle, Los Angeles, CA 90040-3696, USA.	
	C64	RUOFF, P. "How Bromate Oscillators Are Controlled", Am. Chem. Society, 1988.	
	C65	Sentient Six digital guitar interface, PASSAC, Milpitas, CA 95035, USA.	
	C66	SGE MACH II, Applied Research and Technology, 215 Tremont St., Rochester, NY 14608, USA.	

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<i>JS</i>	C67	SHAPIRO, LARRY S, Affine Analysis of Image Sequences, 1995, Press Syndicate of the Cambridge University Press.	
<i>JS</i>	C68	SLAWSON, WAYNE, Sound Color, 1985, University of California Press, Berkeley, CA, USA.	
<i>JS</i>	C69	SNELL, JOHN M. "Sensors for Playing Computer Music with Expression", Proceedings of the Intl. Computer Music Conf. at Eastman, 1983.	
	C70	<del>Switchblade 16, Sound Sculpture, 5741 Arapahoe Rd. Ste. 20 Boulder, CO 80303, USA.</del>	
	C71	<del>Synthophone, Softwind Instruments, 304 Newbury St. Ste. 323, Boston, MA 02153, USA.</del>	
<i>JS</i>	C72	Tactile sensors and the gripping challenge, IEEE Spectrum Aug. 1985.	
	C73	<del>The Fretless Wizard, Biaxe, P.O. Box 15426, Stamford, CT, 06901-0426, USA.</del>	
	C74	<del>Trilogy, Hipshot Music Prods. Van Nuys, NY, USA.</del>	
	C75	TYSON, JOHN J., The Belodsov-Zhabotinskii Reaction, Springer-Verlag, Berlin/Heidelberg, Germany.	
	C76	Unlocking the Secrets of HRM (Harmonic Restructure Modeling), Craig Anderton, Roland Users' Magazine. 7200 Dominion Circle, Los Angeles, CA 90040-3696, USA.	
	C77	Various 6D-Tracking Products, Ascension Technology Corporation, PO Box 527, Burlingame, VT 05402, USA.	

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<i>[Signature]</i>	C78	VERNER, J. Artif Starr Switch Company Ztar 624-D, Electronic Musician, Nov. 1994.	
	C79	VG-8 Users Manual, Roland Corporation, 7200 Dominion Circle, Los Angeles, CA, 90040-3696, USA.	
<i>[Signature]</i>	C80	VIBERG, MATS, Subspace Fitting Concepts in Sensor Array Processing, Linkoping Studies in Science and Technology, 1989, Dissertations No. 27 Linkoping, Sweden.	
<i>[Signature]</i>	C81	VISINTIN, A. (ed.), Models of Hysteresis, Longman Scientific & Technical, 1993, Harlow, England.	
<i>[Signature]</i>	C82	WANG, X-J, and NICOLIS, G. "Bifurcation Phenomena in Coupled Chemical Oscillators: Normal Form Analysis and Numerical Simulations", Physica 26D (1987), pp. 140-155, North-Holland, Amsterdam.	
<i>[Signature]</i>	C83	WESSEL, C., "A Tutorial on Non-linear Distribution or Waveshaping Synthesis", Computer Music Journal, Jun. 1979, Vol. 3, No. 2, pp. 29-34, People's Computer Company, Menlo Park, CA., USA.	
<i>[Signature]</i>	C84	WILKINSON, SCOTT "SynchroVoice MidiVox" Electronic Musician, Jul. 1992.	
<i>[Signature]</i>	C85	WINCKEL and FRITZ, Music Sound, and Sensation: A Modern Exposition, 1967, Dover, New York, USA.	
	C86	Wind Machine, Amatek, Creation Technologies, 400 Brooksbank Ave. B.C. Canada V7J-1G9	
	C87	WX11 and Wt11, Yamaha, 6600 Grangerthorpe Ave., Box 6600, Buena Park, CA, USA.	
	C88	XSDR A12 Synthesizer Module, KORG, Suginamiku, Tokyo, Japan.	

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**INFORMATION DISCLOSURE  
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<i>ML</i>	C89	Yamaha FS1R, Electronic Musician, Dec., 1998.	
<i>ML</i>	C90	Yamaha WX11 and WT41, Midi Magazine Mar./Apr. 1994 Yamaha Corp. of America, 6600 Orangethorpe Ave., PO Box 6600 Buena Park, CA 90622-6600, 714 522-9011.	
<i>ML</i>	C91	ZTAR Midi Fingerboard Controllers-Starr Instruments/Starr Switch, 1717 Fifth Ave., San Diego, CA 92101, USA.	
<i>ML</i>	C92	LIPPOLD HAKEN, "An Indiscrete Music Keyboard," Computer Music Journal, Spring 1998, pgs. 30-48.	

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